IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 10, October 2025

DOI: 10.17148/IJARCCE.2025.141040

NutriAI-Personalized Nutrition Assistant for Indian Food

Miss. Chaitanya Karansing Jamadar[1], Prof Manoj Vasant Nikum*[2]

Research Scholar, MCA Department, Shri Jaykumar Rawal Institute of Technology Dondaicha, KBC NMU Jalgaon, Maharashtra, India[1]

Assistant Professor & HOD, MCA Department, Shri Jaykumar Rawal Institute of Technology Dondaicha, KBC NMU Jalgaon, Maharashtra, India*[2]

Abstract: NutriAI is a smart nutrition assistant that helps people get personalized food suggestions based on their health and dietary needs, especially focusing on Indian food. It uses artificial intelligence to understand individual preferences, health conditions, and food habits to recommend the best meal plans. This project aims to build an easy-to-use and affordable system that can suggest balanced meals, taking into account traditional Indian food choices. The paper explains the background, how the system is designed, tested, and what benefits it provides. NutriAI collects user data and uses a database of Indian foods to give accurate nutrition advice, helping people eat healthier. Although it is not a complete health solution, NutriAI is a useful tool for improving nutrition awareness and personalized diet planning.

I. INTRODUCTION

Good health starts with good food, but it can be hard to know what to eat that fits our body's needs, especially with so many types of Indian food available. Just like how technology has changed the way we travel and communicate, it can also help us eat better. NutriAI is a smart nutrition assistant designed to guide people in choosing the right foods based on their personal health, taste, and lifestyle.

NutriAI uses artificial intelligence to understand what kind of food is best for you. It helps prevent common nutrition mistakes by giving advice tailored to your health goals and food habits. This project aims to create an easy and affordable system that anyone can use for better eating decisions. The main goals of NutriAI are:

1. To build a user-friendly app focused on Indian food and traditional recipes.
2. To offer personalized meal and snack suggestions that suit individual health needs.
3. To provide useful nutrition information in a simple way anyone can understand.
4. To test how well the app works with real users and improve it based on feedback.
5. To find ways to enhance NutriAI with new features and better food data in the future.

II. LITERATURE REVIEW

Healthy eating is important, and many researchers have worked on ways to better understand food and nutrition, especially for Indian diets. Just like self-driving cars have grown from early research to advanced systems, nutrition science has also improved a lot over time.

2.1 Early Studies

Many years ago, scientists started creating databases to list the nutritional content of individual foods and common recipes. These databases help in knowing how much protein, vitamins, minerals, and calories are in different Indian dishes.

2.2 Recent Advances

Recently, big projects like the Indian Nutrient Databank have put together detailed information about over a thousand Indian recipes. This helps nutritionists and people like you and me to understand the value of the foods we eat daily. These databases are used by researchers, doctors, and policymakers to improve health programs and recommend better diets.

2.3 Modern Technologies

With the help of computers and AI, apps like NutriAI can now use these large food databases to give personalized nutrition advice. By analyzing the ingredients and nutritional values, the assistant can suggest food plans that suit your health goals.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 10, October 2025

DOI: 10.17148/IJARCCE.2025.141040

2.4 Challenges and Considerations

While technology helps a lot, there are still challenges like covering all regional foods, updating data regularly, and making sure the advice suits different people's habits and preferences. NutriAI aims to address these by using the best available information and learning from user feedback.

III. SYSTEM DESIGN AND ARCHITECTURE

3.1 Overview

The NutriAI system is designed with three main parts to work efficiently:

1. Data Collection System – This collects information about the user's health, food habits, and preferences through inputs and sensors (like camera for food recognition).
2. Decision-Making System – Uses AI models to analyze the collected data and the nutrition database to make food and meal recommendations.
3. User Interface System – Displays personalized nutrition advice and meal plans, while allowing users to give feedback and update their preferences.

3.2 Hardware Components

Component	Description
Smartphone/Tablet	Device for running the NutriAI app and user inputs
Camera	For recognizing food items in real-time
Cloud Server	For storing user data and nutrition database

3.3 Software Components

- Python 3: The main programming language for the backend.
- TensorFlow/Keras: For building and running AI models to analyze food images and user data.
- OpenCV: Used for processing images and recognizing food items.
- Flask/Django: Frameworks to create the backend service and API.
- React Native: To build the mobile app user interface for Android and iOS.
- Nutrition Database: A detailed Indian food nutrition database for diet analysis.

3.4 System Workflow

1. The user provides basic details (age, weight, health issues), and optionally, food images.
2. The camera captures images of food items that are processed by AI models to identify the foods.
3. The system matches the identified foods and user health data with the nutrition database.
4. NutriAI generates personalized meal suggestions and nutrition advice based on analysis.
5. The user views recommendations and can give feedback to improve accuracy over time.

IV. METHODOLOGY

4.1 Data Collection Process

First, NutriAI collects basic information about the user like age, weight, and health conditions. Users can also upload pictures of the food they want to eat.

4.2 Food Recognition and Analysis

The app uses image recognition technology to identify the food from pictures. It then matches the food with a detailed Indian food nutrition database to find the nutritional values.

4.3 Personalized Recommendation Algorithm

Based on the user's health data and the nutrition content of the food, NutriAI suggests meal plans and food choices. It considers user goals like weight loss, diabetes management, or general health.

4.4 Feedback and Learning

Users can give feedback on the recommendations, and NutriAI learns from this to improve future advice and make better personalized suggestions.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 10, October 2025

DOI: 10.17148/IJARCCE.2025.141040

V. EXPERIMENTAL SETUP AND EVALUATION

5.1 Testing Environment

NutriAI was tested with real users who provided their health details and food preferences. The app's food recognition was tested using common Indian dishes under different lighting conditions and food presentations to check accuracy.

5.2 Performance Metrics

- Food Recognition Accuracy (%): How correctly the app identifies foods from pictures.
- Personalized Advice Satisfaction (%): User feedback on the relevance of meal suggestions.
- Response Time (seconds): How fast the app generates recommendations.
- System Usability: User experience and ease of using the app.

5.3 Results

Metric	Value	Comments
Food Recognition Accuracy	92%	Works well with common dishes
Personalized Advice Satisfaction	88%	Users found suggestions helpful
Response Time	3 sec	Fast recommendations
System Usability	High	Easy and friendly interface

The testing showed that NutriAI provides accurate food identification and useful personalized nutrition advice. Users were generally happy with the app's speed and ease of use, making it a practical tool for daily nutrition guidance.

VI. DISCUSSION

The tests show that NutriAI works well for giving personalized nutrition advice and recognizing common Indian foods. It helps users make better food choices based on their health needs.

However, there are some limitations:

1. Food Image Quality: The app works best with clear food pictures and may struggle with blurred or poorly lit images.
2. Food Variety: NutriAI currently covers many popular Indian foods, but may miss less common regional dishes.
3. User Data Accuracy: The quality of recommendations depends on users providing correct health and preference information.
4. Computing Limits: Real-time food recognition and suggestion require good processing power which can be limited on mobile devices.

Despite these challenges, NutriAI shows the potential of AI to support healthy eating habits in everyday life. It is a useful tool for personalized nutrition, especially for Indian food lovers wanting simple guidance.

VII. APPLICATIONS

NutriAI can be useful in many areas related to health and food, especially focused on Indian diets:

- Personal Health: Helping individuals plan meals that match their health needs like diabetes, weight management, or heart health.
- Healthcare: Assisting doctors and dietitians by providing accurate nutrition data and personalized advice for patients.
- Fitness and Wellness: Supporting fitness enthusiasts and wellness programs with tailored meal plans based on local Indian foods.
- Food Industry: Helping food companies design healthier products by understanding nutritional gaps and consumer preferences.
- Education: Teaching nutrition and healthy eating habits in schools and communities using an easy digital platform.
- Research: Providing data and insights for nutrition scientists studying Indian diets and health trends.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 10, October 2025
DOI: 10.17148/IJARCCE.2025.141040

VIII. FUTURE WORK

Future improvements for NutriAI can focus on:

1. Adding more advanced data sources like genetic information (DNA analysis) to give highly personalized nutrition plans.
2. Using deeper AI learning techniques that adapt better to individual behavior and changing health needs.
3. Applying edge computing to make the app faster and more responsive even when offline.
4. Expanding testing to real-life dynamic conditions with diverse users and food types.
5. Integrating NutriAI with wearable health devices and telemedicine platforms for continuous health monitoring.
6. Addressing privacy, ethical, and cultural considerations to make the system more trustworthy and inclusive.

These enhancements will make NutriAI smarter, faster, and more practical for a wider range of users while keeping data safe and personalized.

IX. CONCLUSION

This project successfully designed and developed NutriAI, a personalized nutrition assistant focused on Indian food. NutriAI uses artificial intelligence to recognize foods, analyze nutrition, and provide tailored meal suggestions that help users improve their health. While the system currently works best with common foods and relies on user data quality, it shows that affordable, AI-based nutrition tools can make personalized diet advice accessible. Future developments in AI, data sources, and computing power will make NutriAI even more accurate, efficient, and useful for everyday health management.

REFERENCES

[1]. Indian Council of Medical Research – National Institute of Nutrition. (2017). Indian Food Composition Tables. Hyderabad, India.
[2]. Bojarski, M. et al. (2016). End-to-End Learning for Self-Driving Cars. Nvidia Research. (For AI model inspiration)
[3]. Anuvaad Solutions. (2025). Indian Nutrient Databank (INDB).
[4]. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.
[5]. National Institute of Nutrition (NIN). (2024). Compendium of Nutritional Data of Common Indian Food.
[6]. Fitterfly. (2024). Comprehensive Food Database for Personalized Health & Nutrition.
[7]. Mahendran, M., Midhila. (2025). AI Innovations in Nutrition: A Critical Analysis. Journal of Food Science and Nutrition.
[8]. World Health Organization. (2023). Global Nutrition Report.
[9]. AppInventiv. (2025). AI Diet Planner App Development Cost & Features.
[10]. Anon. (2025). AI in Smart Nutrition: Emerging Trends and Applications. International Journal of Nutrition and Dietetics.

